Basic Electrics

Wiring a layout

Presentation to MMRS June 2016

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Begin at the Beginning !

Questions to ask Before you start !

1) Are the locos electrically powered? If no, go to 2.

2) Is any part of the layout electric? If no, go to sleep / home

If locos are electric, do you want DC or DCC? (very important)

If layout has electric control:

Direct wiring (the old method. Simple but loads of wiring)

A ‘bus’ system (much less wiring, more flexibility for future)

Where to start - or not !

If starting a new layout.

Do a scale (or even full size) track plan.

Where are the turnout motors?

Think about the wiring (all electrics) NOW!

DCC or DC. What will control the layout ?

What and where will the control panel(s) be?

What power supplies will be needed?

Any inter-board connections?

How and where will connectors be located?

Allow for possible future developments.

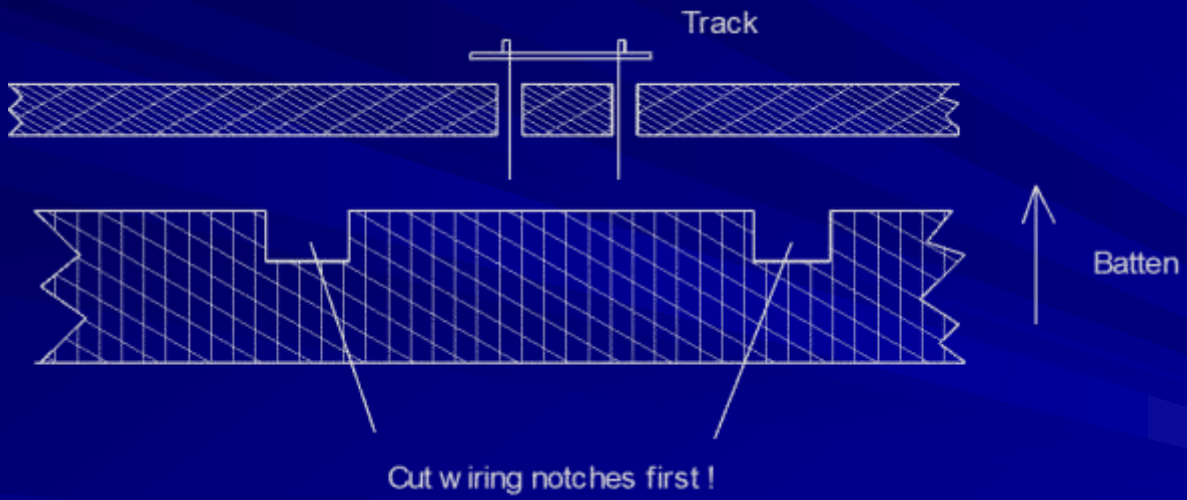
Only now should you plan the baseboards.

Baseboard construction

What has this to do with wiring ? Surely you start with a baseboard?

No. You design and build the baseboard to suit the layout AND wiring.

If using the conventional British ‘flat plywood’ baseboard



Make sure battens don’t conflict with point motors.

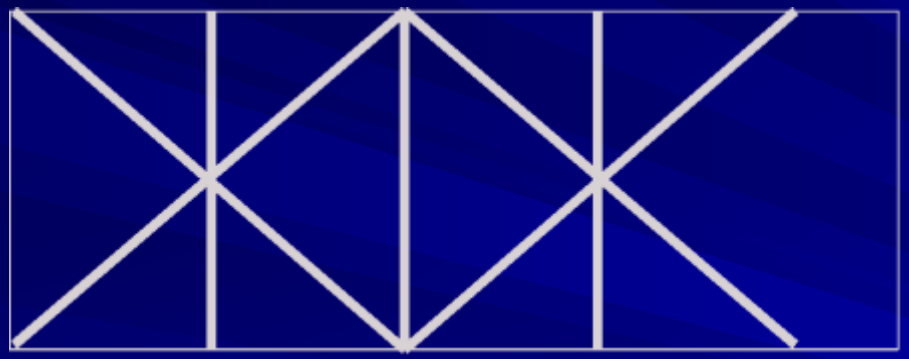
Wiring is now held against the baseboard.
Easy to add more wiring. Avoid notches under the track.
Make holes for droppers before laying track.
Consider laying the track AFTER the wiring.

The American ‘open plan’ structure is easier for wiring but possibly less rigid.

Retrofit wiring

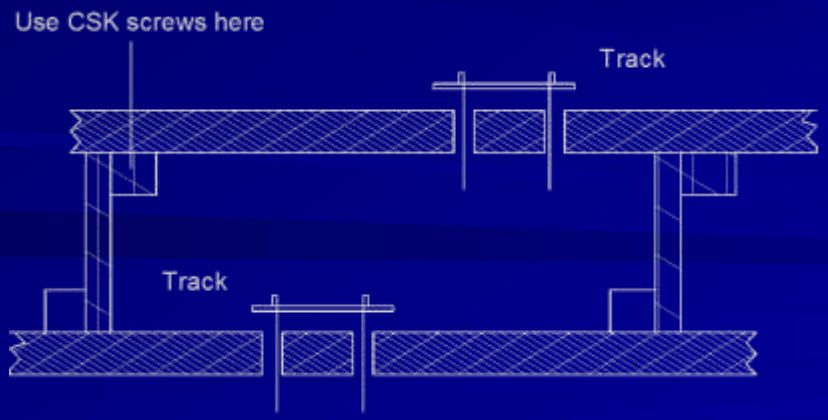
This can be very difficult.
Drilling holes in cross battens may be impossible. A ‘Right angle’ drill is necessary.
Wiring spaced away from baseboard is vulnerable. Cannot be secured.

Vertical access to the baseboard underside is essential.



Good batten arrangement for rigidity.

Worst possible for wiring unless notched first.



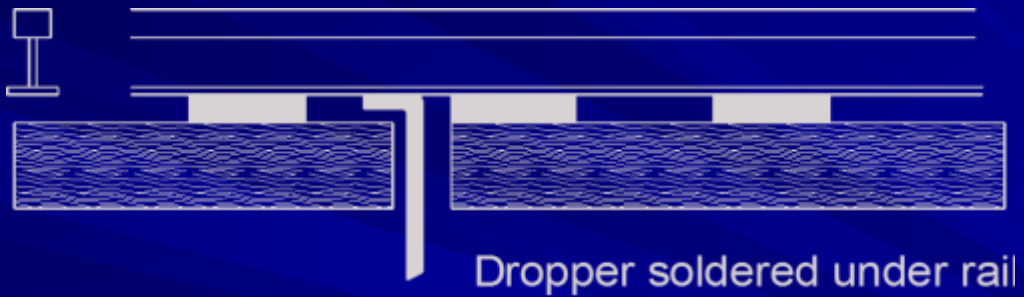
Double deck layout.
Access to underside of top board essential.

Top board secured with screws only, so it can be removed.

Track wiring

Droppers.

Only need one per track length. Never rely on ‘fishplates’ / rail joiners. Best not to solder rail joiners. Don’t attach droppers to rail joiners. Solder droppers to track before fitting track. Solder under the track. Droppers and joints now hidden in ballast.

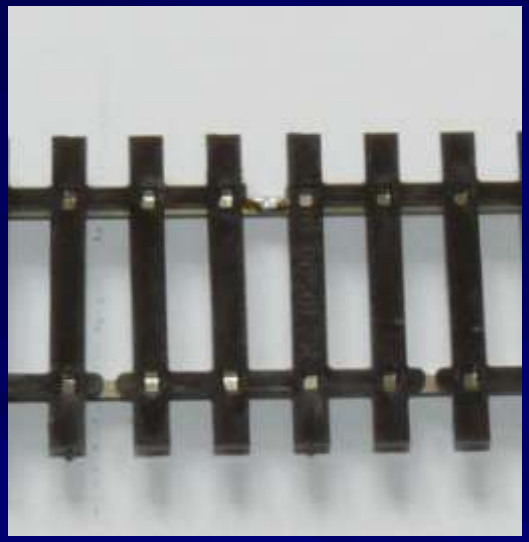


Droppers can be solid wire.

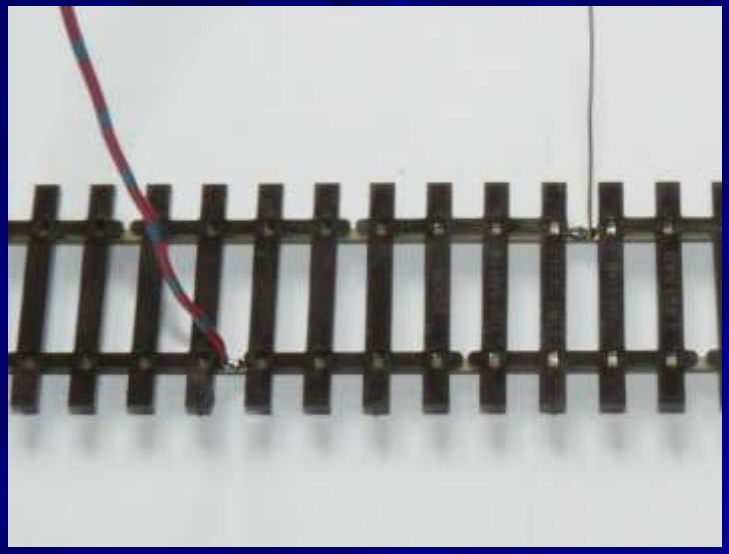
22 SWG (about 0.5mm dia.)
or 7/0.2 insulated.
Keep short.

Do the wiring first, before any scenery etc. Turn layout over to wire it. Don’t try wiring from underneath. Make sure layout runs before any scenery , buildings etc. are added.

Fitting droppers



Cut web. Tin track



Solder droppers. Bend end at 90 degrees

Spot the droppers !

Wiring the layout.

Size of wire.

If DCC, consider maximum current. 5 to 10 amps
Can use ‘mains’ cable. Avoid brown/blue if possible
Run a ‘bus’ round the layout.

For DC, wire can be thinner but plan the block sections and number of controllers.

Connectors.

Availability, cost, reliability.
How many ways?
Inter-board links

Most layout problems are with ‘connectors’.

Secure all wiring.

Think of damage during transport or even careless operation.

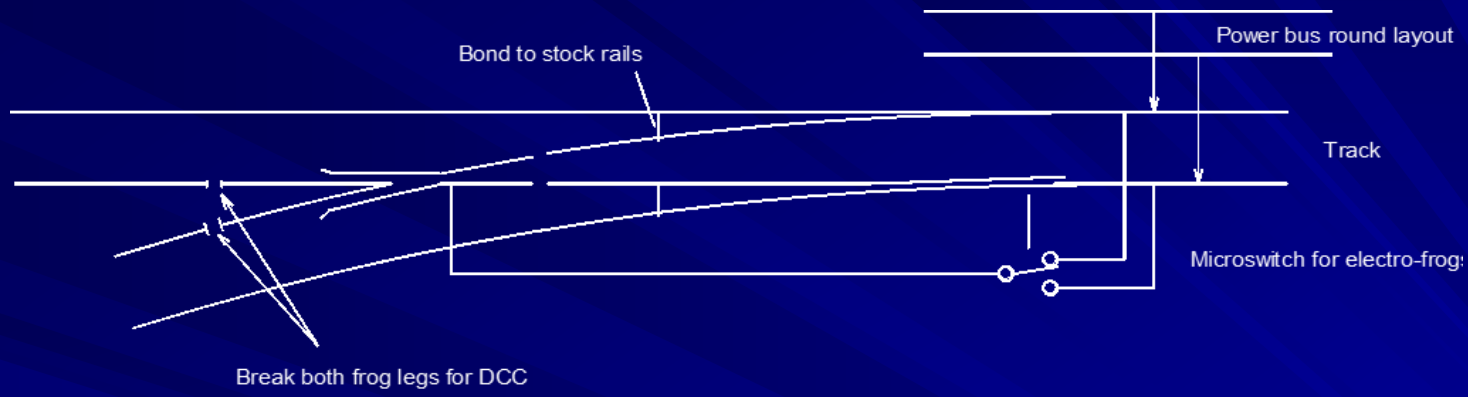
D Type connectors.

Cheap, reliable, multiway.
Only suited to soldering.
Have good covers and clamps
Rated 5 amps per pin.

Come in 9 way to 37 way

Solder bucket type.

Turnout wiring



Wiring a live frog

Simple microswitch mounting on a Peco solenoid

Very simple servo mounting for turnouts.

Power supplies

Avoid any mains round or under the layout.

Avoid transformers if possible. (Fit fuses anyway)

Use ‘switch mode’ power supplies (SMPS).

Cheap now.
Fully enclosed.
Conform to regulations.
Don’t get hot.
Overload protected.

Soldering

Use ‘electrical’ (multicore) solder. Do NOT add extra flux.
60/40 or 60/38/2 solder is fine.
Never use ‘lead free’ solder.

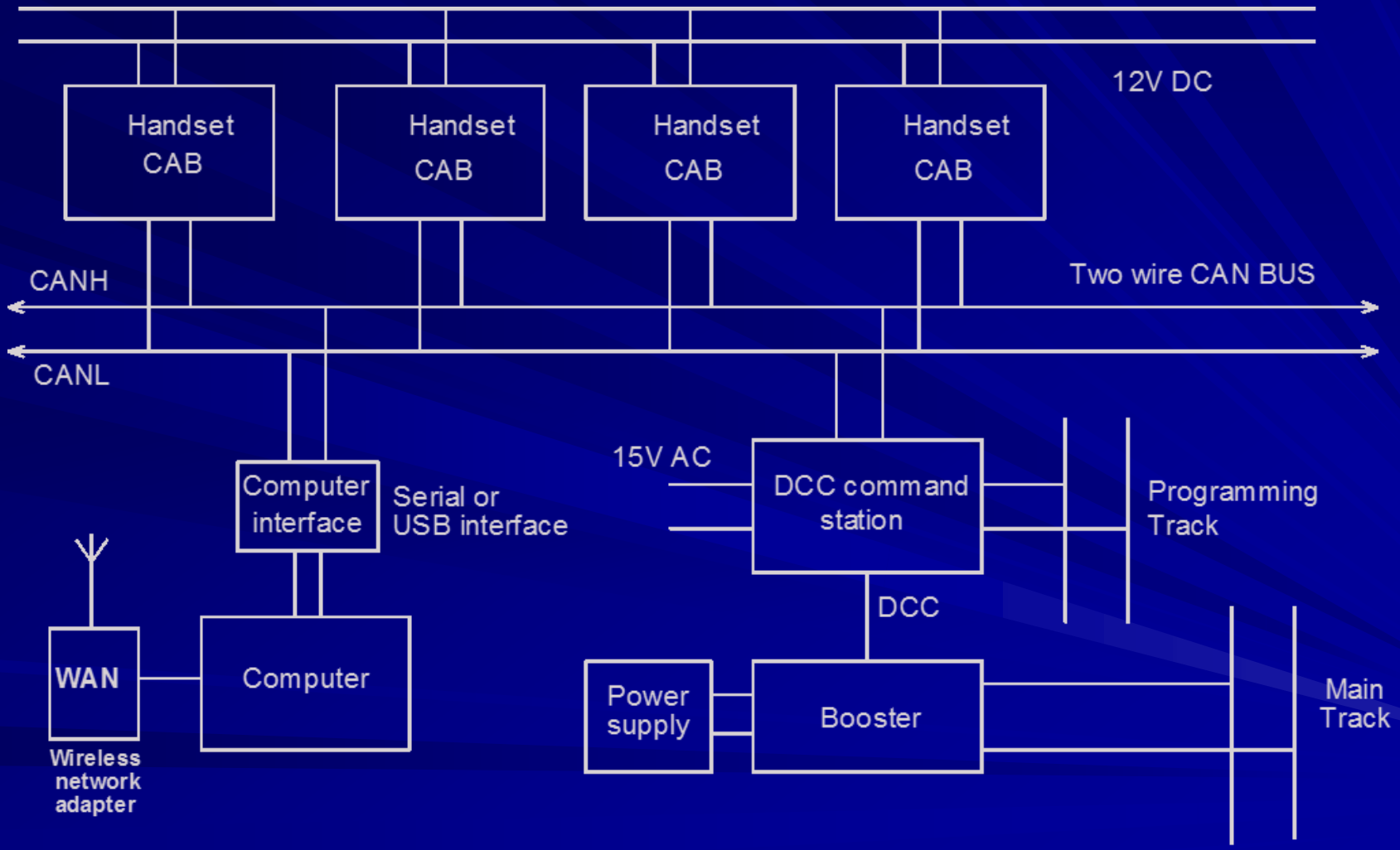
Switch mode power supplies

DC output only. Wide range of sizes, voltages and current
Very safe. Do not get hot. Overload protection.
0v output not always isolated from earth.

10 amp
15V

3.5 amp
12V

Full DCC system



Two wires for control, 2 wires for system power, two wires for DCC bus = 6 total !

OK

That’s enough for now !

Any questions?